**Ch. 2 Review ANSWERS p. 245 #1 – 5, 8, 9, 19, 29, 30**

1. **COLLEGE**

Top left = 0.69 Top right = -0.71

Bottom left = 0.23 Bottom right = -0.51

1. **TOGETHERNESS**

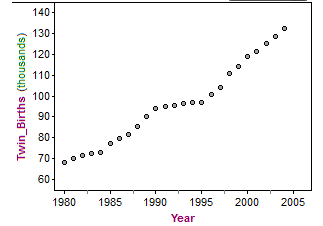
Mean of meals = 3.78

Std dev of meals = 2.2

1. When a family has 0 meals together, the student GPA is on average 2.73 points.
2. For every 1 meal per week that a family eats tougher, the student GPA increases by 0.11 points on average.

1. Negative residual = actual y value is lower than predicted y-value.

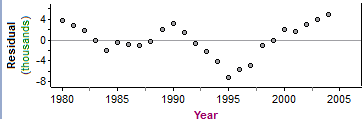
In this context, it would mean that the predicted GPA was more than the actual GPA. The meals per week did not help the student’s GPA as much as predicted.

1. NO!! ASSOCIATION ≠ CAUSATION. Increasing the number of meals eaten as a family per week may not CAUSE GPAs to increase.
2. **VINEYARDS**
3. There doesn’t appear to be much of linear relationship between Age of Vineyard and Case Price. The r2 is very low and the slope is a very low positive number, close to 0.
4. Nothing. We cannot extrapolate the results from NY State to the rest of the world.
6. The r2 is very low, so only 2.7% of the change in Case Price is due to the change in the Age of the vineyard.
7. **VINEYARDS AGAIN**
8. No, there is little evidence of an association. The scatterplot is not very linear- it is really scattered.
9. The outlier in the lower right corner. It has high leverage and is influential.
10. Correlation would become weaker. The outlier is making the scattered plot look linear, when really it is not. When you take out the point, the plot would be completely scattered.
11. Slope would increase- it would change from negative to positive.
12. **MORE TWINS 2004**
13. 

1. For every 1 year, the number of twin births (in thousands) increases by 2618.255 on average.
2. = 143,103.676 thousand births

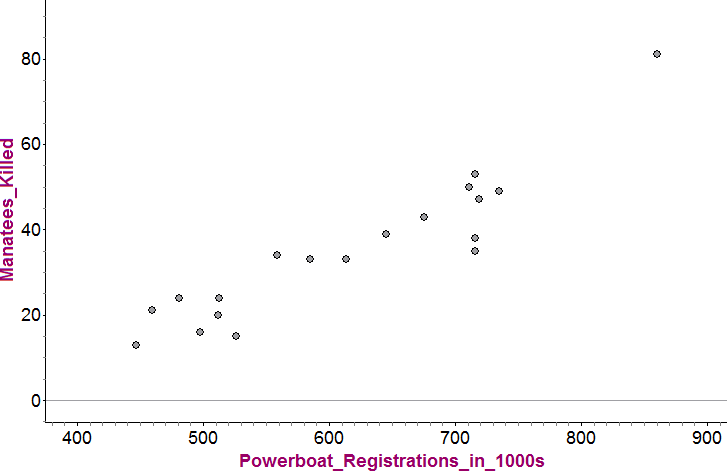
I am not very confident in the prediction. The residual plot is scattered, showing that another model (not linear) would be better for predicting twin births from year.

1. There is a clear pattern. The linear model is not the best fit for the data



**8) MANATEES 2005**

1. The explanatory variable would be the powerboat registrations. The biologists want to see if increasing powerboat registrations are linked with increases in manatee deaths.
2. Scatterplot



The scatterplot shows a strong(r=0.924) linear, positive association with an outlier with in the pattern at (974,79)

1. r = 0.924
2. Though there is a strong association we can not prove that it is a cause and effect relationship.

**9) A MANATEE MODEL 2005**

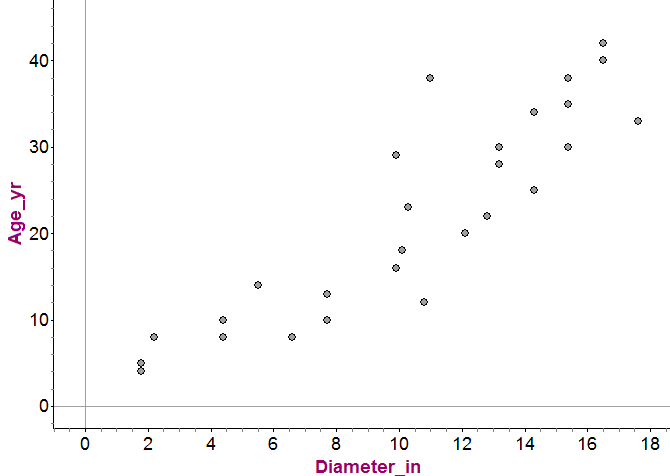
1. 
2. On average for every increase of 1000 registrations in powerboats there tends to be an increase of 0.132 deaths in manatees.
3. If there were no powerboats registered the number of manatees killed is negative 45.89
4. 

e = 79 – 82.675 = -3.675 manatees killed

1. Negative residuals. That would mean less manatees would actually be killed than predicted.
2. The trend is that through the years both the number of powerboats registered and the number of manatees killed have both increased. If the trend continues more manatees could be killed. Extrapolation is dangerous though.

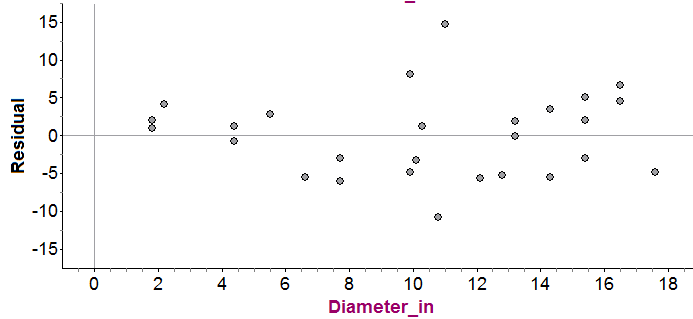
**19) HOW OLD IS THAT TREE?**

1. r = 0.888; Correlation alone shouldn’t be used to determine the appropriateness of the linear model.
2. Scatterplot



Scatterplot shows positive, moderately strong(r = 0.888), linear association with no apparent outliers

1. 
2. Residual Plot



There is a possible curved pattern in the residual plot that would mean the linear model is not appropriate.

1. Since the residual for the larger trees seems to have more positive residuals I would expect the model to underestimate the age of the tree.

**29. JUMPS 2004**

* + 1. The scatterplot shows a positive, linear, strong(r = 0.925) with no apparent outliers
    2. We see a positive relationship but there could be lurking variables.
    3. Change in units won’t affect the correlation
    4. I would predict that the long jump would be 0.925 standard deviations better than the mean long jump.

**30) MODELNIG JUMPS**

* + 1. LSRL



* + 1. For every increase of 1 inch in the long jump there tends to be an increase of 0.331 inches in the high jump
    2. 
    3. This model predicts the high jump from the long jump. To predict the long jump from a high jump a new model must be calculated.
    4. new model

